Appendix A.

NOAA'S AQUACULTURE POLICY

I. Introduction

Worldwide fisheries production will be inadequate to meet the needs of the world=s population, without supplementation through aquaculture. Constituent and Congressional support for aquaculture dictates that the National Oceanic and Atmospheric Administration (NOAA) bring together its diverse programs to develop a comprehensive aquaculture policy and strategy to provide a context for agency activities for the next ten to twenty years. The impetus for the development of aquaculture extends beyond food production. NOAA involvement in aquaculture can help to foster sustainable economic development and environmentally friendly technologies, create new employment opportunities, reduce the trade deficit in fish products, reduce fishing pressure on living marine resources, and rebuild depleted stocks.

The 1980 Memorandum of Understanding (MOU) between the Departments of Agriculture (USDA), Commerce (DOC) and Interior (DOI), defined aquaculture as Athe propagation and rearing of aquatic species in controlled or selected environments@. Pursuant to this MOU, DOC, through NOAA=s National Marine Fisheries Service (NMFS), and the National Sea Grant College Program, carried out aquaculture research and development on marine, estuarine, and anadromous species. Work on anadromous species has been coordinated with DOI and USDA (Forest Service). The National Sea Grant College Program has conducted research, education, training and advisory services in aquaculture; its advisory services programs have been carried out in collaboration with USDA=s Extension Service. Subsequent to the establishment of this MOU, the Fisheries Finance Program, administered by NMFS, and the Coastal Zone Management Act (CZMA), administered by NOAA=s National Ocean Service (NOS), were amended to include comprehensive planning, conservation and management of aquaculture facilities within the coastal zone.

Furthermore, the National Aquaculture Development Act of 1980, amended in 1985, established a coordinating group, the Joint Subcommittee on Aquaculture (JSA), chaired by USDA. The JSA has been responsible for developing the National Aquaculture Development Plan, which identifies the relative roles of USDA, DOI and DOC, and establishes a strategy for the development of an aquaculture industry in the United States.

NOAA, the Federal Oceans agency, has a strong statutory basis for the promotion and regulation of marine aquaculture. A listing of the legislative authorities is attached (Attachment 1). NOAA, having the greatest responsibility for the sustainable use and conservation of marine resources and the environment, is best suited to oversee aquaculture activities that affect marine ecosystems and occur in public waters. NOAA has a variety of established responsibilities for marine, estuarine, and anadromous species aquaculture; including research, development, and outreach, for stock enhancement and private sector development, as well as the adoption of appropriate environmental safeguards and technology.

If the current estimates for world per capita consumption of seafood are accurate, the projected demand for seafood will not be met without growth and technological advancement in aquaculture to supplement the harvest of wild stocks. Aquaculture is one method to meet the projected demand, and should be conducted in concert with a variety of fisheries management techniques, including better product utilization, improved processing technology, improved habitat conditions to support natural fisheries, and consumption of species currently not utilized.

The development of a robust aquaculture industry has the most potential to fill the seafood needs of the domestic market by reducing imports of fishery products and benefiting the nation's balance of trade. Aquaculture for the purposes of marine stock enhancement also has associated economic benefits, such as increased employment associated with the enhancement effort, and the continued health of the commercial fishing and recreational fisheries industries. In addition, aquaculture technologies and consulting services for private industry and enhancement efforts, as well as superior, disease-free strains of broodstock are valuable exports that contribute to the U.S. economy.

II. Current Status of Aquaculture in NOAA

NOAA's primary focus for aquaculture has historically been through NMFS programs, and the National Sea Grant College Program in the Office of Oceanic and Atmospheric Research (OAR). Many aquaculture-based enterprises have benefited from NOAA research and extension activities. In 1996, Congress, in amending the CZMA, administered by NOS, encouraged States to work with NOAA in aquaculture, siting, management and planning activities. The types of activities undertaken to support aquaculture in each of the three line organizations are described below.

NMFS

NMFS plays a significant role in promoting aquaculture that is environmentally sound, through scientific research and technology development, financial assistance and its regulatory programs. NMFS has carried out aquaculture programs since its inception as the United States Commission of Fish and Fisheries, 125 years ago. Since then NMFS/NOAA has been involved in aquaculture research and development for finfish and shellfish in commercial applications and for enhancement. Intensive U.S. marine aquaculture research and development on salmon in the late 1960's provided the basis for the development of industries in the United States, Norway, the United Kingdom and Chile. NMFS basic research on finfish and shellfish biology and reproduction, habitat utilization and restoration, environmental impact assessment, and fish pathology supports private and government aquaculture and marine enhancement activities. Much of the information developed by NMFS has been used both in the commercial sector where it has been instrumental in the development of the farmed salmon industry, as well as shellfish hatcheries and shrimp culture operations throughout the world. NMFS has also played an integral role in the rearing of threatened and protected species for stock recovery.

NMFS presently spends approximately $10 million per year for the operation of 25 major salmon hatcheries in the Columbia River Basin through the 1938 Mitchell Act which was established to mitigate loss of salmon runs because of construction of hydroelectric projects. The Mitchell Act hatchery program is the largest Federally funded marine fisheries enhancement program in the United States. NMFS-administered state/Federal and industry grant programs have addressed aquaculture development in response to industry needs and state management priorities. In the last five years, the Saltonstall-Kennedy Grant Program has provided funding for commercial aquaculture projects of between $500,000 and $1.7 million dollars annually. In Alaska, since ratification of the U.S./Canada Pacific Salmon Treaty in 1985, NMFS has provided over $20.0 million for salmon enhancement projects. In FY1994 and FY1995, the Northeast Fishing Industry Grants program supplied $1.2 million and $2.19 million respectively for aquaculture-related projects. These projects were aimed at creating commercial development opportunities for displaced New England fishermen. Additionally, the NMFS Fisheries Finance Assistance Program has been specifically authorized to guarantee aquaculture loans, facilitating financing for qualified applicants.

On the regulatory front, the Fisheries Management Councils are becoming involved in the decision-making process for offshore permitting for aquaculture. Because permit-granting may involve the granting of exclusive use in a designated area to an aquaculture business, the traditional users of the resource must be incorporated into the regulatory process. This process has involved the granting of a lease to an experimental scallop culture project off the coast of Massachusetts, through an amendment to the New England Scallop Fishery Management Plan, and the consideration of an experimental permit for the culture of red snapper in the Gulf of Mexico. NMFS, through the Magnuson-Stevens Fishery Conservation and Management Act of 1996, has regulatory responsibilities that will affect aquaculture development in the EEZ.

OAR

Aquaculture has been a major component of the National Sea Grant College Program's research and outreach activities since the program's establishment in 1968. Sea Grant, administered through OAR, has supported technology development for the existing U.S. industry in many areas including offshore and recirculating marine systems, hormonal control of growth and reproduction, growout technology, feeds and nutrition, disease control, regulation, marketing, food processing, and environmental technologies to meet water quality standards. Aquaculture related projects account for approximately $10 million direct and matching Sea Grant funds on an annual basis. This figure does not include approximately $1.5 million annually in outreach-related activities provided through the Sea Grant Extension Service, or nationwide programs such as the Oyster Disease Research

Program. Sea Grant supports aquaculture activities in research, education, and technology transfer. Sea Grant research on systems development, genetics, physiology and endocrinology, nutrition, disease, policy, and economics has contributed to the creation of several new industries including the Gulf of Mexico and South Atlantic soft shell crab industry, the Pacific Northwest oyster and clam industry, the hybrid striped bass industry, and the Mid-Atlantic hard clam industry. Sea Grant research and outreach has helped to establish scores of new businesses throughout the U.S., and to provide improved technologies to these businesses. The combined impact of Sea Grant-developed technology amounts to at least $100 million annually and supports thousands of jobs in the U.S. economy.

Sea Grant has also collaborated extensively in the international arena, creating opportunities for aquaculture technology exchange between the U.S. and Japan, China, Israel, France, Russia and Ireland. NOAA, through Sea Grant, and Japan have been working together for more than 20 years to enhance the development of freshwater and marine aquaculture through the Aquaculture Panel of the U.S. Japan Cooperative Program in Natural Resources. Sea Grant has conducted technology exchange between the U.S. and China on scallop culture through a bilateral agreement. The U.S. Israel Science and Technology Foundation has provided funds for aquaculture research with Sea Grant members. Sea Grant=s efforts have been important in promoting NOAA as an important global resource in the development of aquaculture.

The Sea Grant program is also a participant in the Sustainable Development Extension Network, which is a collaboration among Federal education and extension services and their public/private partners. DOC has pledged to assist communities in developing eco-industrial parks, stabilize and redevelop brownfield industrial sites, integrate environmental technical assistance into the manufacturing extension network, expand and improve access to environmental information, support research, and restore the Nation=s fisheries. The network provides NOAA with an opportunity to facilitate Federal coordination in aquaculture extension.

NOS

Congress, in passing the CZMA of 1972, encouraged states and territories to exercise their responsibilities of wise use of the land and water resources of the coastal zone through the development and implementation of management programs. The national coastal zone management program balances competing demands on the coast and coastal waters. The CZMA created a partnership between the Office of Ocean and Coastal Resource Management (OCRM), state and territorial governments and Federal agencies. Under the CZMA, Federal actions that are reasonably likely to affect any coastal use or resource (including direct Federal agency activities, non-Federal activities requiring a Federal license or permit, and Federal funding to state or local governments) must be conducted in a manner that is consistent with the enforceable policies of state coastal management programs.

Aquaculture is an aspect of coastal management which has received increased attention in the past decade with the passage of amendments to the CZMA in 1990 and 1996. The 1990 amendments encouraged states and territories to support comprehensive planning, conservation and management for living marine resources including aquaculture facilities. The 1996 amendments provided new authorization for states to use CZMA funds for: (1) the adoption of procedures and policies to evaluate and facilitate the siting of public and private aquaculture facilities in the coastal zone; (2) to enable States to formulate, administer, and implement strategic plans for marine aquaculture; and (3) to develop a coordinated process among State agencies to regulate and issue permits for aquaculture facilities in the coastal zone.

Past and on-going projects have ranged from: development of aquaculture net-pen guidelines (Mississippi); impact of aquaculture on the eutrophication of coastal bays (Maine); revision of aquaculture lease rules (Maine); development of a marine aquaculture management plan and geographic information system (Rhode Island); and development and implementation of a marine aquaculture regulatory and leasing program (Virginia). Additionally, OCRM=s system of 14 marine protected areas, the National Marine Sanctuary Program, manages and protects significant natural and historic treasures. The National Estuarine Research Reserve System, currently totaling 21 sites, protects coastal resources and provides a network of laboratories for investigating estuarine processes and offers educational opportunities for coastal managers and the public. Although aquaculture has not been a major focus of the sanctuary and reserve programs, both have ample opportunities to address aquaculture issues.

III. NOAA Policy

For the purposes of this document aquaculture is defined as the propagation and rearing of aquatic organisms in controlled or selected aquatic environments for any commercial, recreational, or public purpose. Potential purposes of aquaculture include bait production, wild stock enhancement, fish culture for zoos and aquaria, rebuilding of populations of threatened and endangered species, and food production for human consumption.

A successful NOAA program to meet public needs for aquaculture development and environmental protection will focus on:

1) Research, Development, and Technology Transfer;
2) Financial Assistance to Businesses;
3) Environmental Safeguards including Regulatory and Permit Procedures; and,
4) Coordination.

NMFS, OAR and NOS will incorporate these priorities into their aquaculture-related activities.

Research, Development, and Technology Transfer

Basic research and development through NMFS, NOS, and Sea Grant programs provide the scientific basis for further enhancement and commercial activities with species not currently being cultured as well as support for existing industries. NOAA considers the following topics to be important to the development of U.S. aquaculture:

Environmental impacts and standards - Research on ways to minimize any adverse impacts of aquaculture on the environment and wild stocks. Using scientific information develop criteria for marine aquaculture operations including determination of permissible discharges, optimal treatment of effluents, requirements for siting new operations, assessment of ecological impacts, both deleterious and beneficial, and necessary information for establishing siting protocols and standards to facilitate the permitting process. Deliver this information to Federal, state and local agencies for state planning, regulatory and permitting processes.

Systems development - Development of cost-effective, environmentally sound aquaculture and hatchery technology for transfer to the private commercial sector and to governmental agencies operating stock enhancement and habitat restoration programs. Focus on two areas for research and development identified as having high potential for involvement by NOAA: open ocean aquaculture and closed system (or Aurban@) aquaculture. Conduct research on recirculating technologies for inland facilities, and on environmentally sound systems for offshore development.

Growth and production of marine species - Maintenance of marine aquaculture species in captivity throughout their life cycle; control and synchronization of reproductive and growth cycles; improvement of technology for production and handling of larvae and all life stages in hatcheries; definition and improvement of nutritional requirements and nutritional value of live feeds; and definition of ecological and pheromonal factors affecting production and develop techniques for spawning and early-stage rearing.

Biotechnology - Development of DNA technology for manipulation, introduction, and expressing genes in aquaculture human food species and species with potential for use either in production of chemical products or in industrial processing to provide strains that grow faster, have higher feed efficiency, produce higher proportions of muscle or desirable compounds, synthesize metabolites at greater rates, or catabolize waste materials or toxic effluents more efficiently; production technology to produce sterile animals for commercial culture to reduce the possibility of genetic contamination from accidental escapements: development of gene probes, compound probes and molecular assays for assessment of endocrine activities and detection and measurement of pathogenic viruses and bacteria; development of vaccines and other measures for controlling disease and parasites.

Technology transfer - Technology transfer to the U.S. aquaculture industry and to Federal, state and local agencies relating to production system management, culture techniques, nutrition, disease diagnosis and control, business management, marketing and environmental technologies to meet water quality standards, will continue to be an important part of NOAA=s aquaculture program. Using education and training develop logical and economically viable alternatives for displaced fishermen. Improve extension, outreach and education efforts to support

aquaculture planning, regulatory and permitting efforts and to support existing industry and to train fishermen, students and other new industry entrants in aquaculture techniques.

Coastal Management - Coordination with management agencies to identify areas in Federal, state and local waters that are appropriate for aquaculture facilities. Develop more efficient Federal and state regulatory and permitting procedures and innovative management tools for resolving user conflicts. Plan for disaster mitigation and prevention related to aquaculture.

Financial Assistance to Businesses

The aquaculture industry has been slow to develop in the United States in part due to the difficulty in accessing capital for investment purposes. A statutory change to the Fisheries Finance Assistance Program (formerly known as the Fisheries Obligation Guarantee Program in 1992 provided authority to include aquaculture facilities. The Fisheries Finance Assistance Program, closed $6 million in aquaculture guarantees in FY '94 and estimates that the majority of its $25 million FY '95 loan authority will be expended on aquaculture projects. In addition the Capital Construction Fund (CCF) could be authorized to also include aquaculture projects. The Capital Construction Fund currently allows commercial fishermen to save pre-tax fishing income dollars (much like an individual's retirement IRA account) to acquire, construct, or reconstruct fishing vessels. The CCF at present allows withdrawals only for investment in fishing vessels. Taxes on deferred income are recouped by the Federal government as the vessel is used, since no depreciation deduction is allowed for CCF capital invested. Adding aquaculture to the CCF program would provide an alternative use for some of the $240 million in existing CCF accounts.

Environmental Safeguards

Permit Procedures: A primary objective of a Federal aquaculture policy is to develop, in coordination with responsible agencies, more efficient Federal and state permit processes to promote industry development. This will involve establishment of national criteria for environmentally safe aquaculture operations. Federal and state agencies will be encouraged to use the national criteria to make consistent and reasonable Federal and state aquaculture regulations and permitting decisions. One Federal agency should be responsible for coordinating the administrative process for Federal aquaculture permitting decisions: the receipt of permit applications, consultation with all permitting agencies, and the issuance of Federal permits. This will reduce the time required for permit approval or denial, reduce the cost to industry, foster better cooperation between Federal and state agencies, and assure that sound science is used as the basis for decisions. To further facilitate the permit approval process within the Exclusive Economic Zone and promote responsible development of the industry, NOAA will identify areas that reduce conflicts with vessel transit lanes, traditional fishing grounds, and protected species habitat, as well as minimize the potential for negative impacts on the environment. Permit requests for aquaculture activities in these areas would receive rapid responses because the areas would have already been designated as approved for aquaculture. NOAA will work closely with coastal states to ensure that the identification of such areas and permit approvals are consistent with applicable provisions of Federally approved state coastal management programs.

Environmental Research and Planning: Growth of aquaculture has brought attention to its potential environmental effects. Most questions focus on the potential adverse impacts of disease, loss of genetic diversity, introduction of non-indigenous species and potential habitat degradation. Federal and State governments must conduct strategic planning to cope with the expected economic development from aquaculture and to ensure that environmental quality is not compromised. These issues apply to most forms of aquaculture. If the U.S. aquaculture industry is to expand, a healthy aquatic environment must be sustained for all users, including the aquaculture industry. Given the high cost of applied research, every effort will be made to use commercial platforms to obtain environmental data, conduct basic biological research, and determine the environmental effects of aquaculture, particularly in the Exclusive Economic Zone. Other issues that merit consideration are the possible accumulation of marine toxins in cultured organisms; the effects of pollution on aquaculture operations; the effects of major discharges from aquaculture operations on fisheries and other biotic resources; the effects of nutrient enrichment, physical alteration (through dredging, filling or construction), and alteration of freshwater flows, to habitat upon which living resources depend.

Finally, it is important that the feedback derived from research is taken into account in the Federal and State regulatory and planning processes. The best scientific information available will be considered in guiding these

processes, and where there is insufficient science a precautionary approach will be taken to adequately safeguard the environment and wild stocks. NOAA will accomplish this mainly through NMFS and the Coastal Zone Management Program administered by NOS: OCRM. NMFS has the ability to set environmental standards for regulation on the Federal level. OCRM can encourage and work with state coastal management programs to do the same on the State level.

Coordination

The responsibility and capability to assist in building an economically and environmentally sustainable aquaculture industry in the U.S. rests with various Federal agencies. By providing a coordinated effort between regulatory agencies, agencies offering economic incentives, the financial sector, and the potential user, NOAA can promote the use of environmentally sound aquaculture technologies and practices, while creating job opportunities in localized areas. NOAA will pursue opportunities to accomplish its policies through joint activities and programs with Federal, State and local agencies, as well as industry, academia and foreign institutions.

Conclusion

A strong NOAA role in aquaculture will create jobs, revitalize communities suffering from the collapse of traditional fisheries stocks, utilize advanced technologies to resolve natural resource conflicts, reduce the fisheries trade deficit, and increase domestic production of finfish and shellfish and recreational opportunities, and ensure that aquaculture is done in an environmentally sound manner. Marine aquaculture can augment restoration efforts of depleted marine stocks and can provide safe, high-quality seafood for consumers.

AUTHORIZING LEGISLATION - Attachment I

Agriculture and Food Act of 1980
Anadromous Fish Conservation Act
Clean Water Act
Coastal Zone Management Act, 1990 and 1996 Amendments
Columbia River Basin Fishery Development Program
Commercial Fisheries Research and Development Act
Endangered Species Act
Fish and Wildlife Act of 1956
Fish and Wildlife Coordination Act
Interjurisdictional Fisheries Act
Magnuson-Stevens Fishery Conservation and Management Act
Marine Mammal Protection Act
Marine Protection, Research and Sanctuaries Act
National Sea Grant College Program Act
National Aquaculture Improvement Act of 1985
National Environmental Policies Act
National Aquaculture Act of 1980
Nonindigenous Aquatic Nuisance Prevention and Control Act of 1990
Rivers and Harbors Act of 1899
Saltonstall-Kennedy Act
Title XI, Merchant Marine Act of 1936 as amended.
Water Resources Development Act

Appendix B. Workshop Steering Committee Members

A special thanks for the assistance provided by:

Northeast:	Judy McDowell, Tony Calabrese and Kim Harrison
Southeast:	Rick DeVoe, Bill Rickards and Paul Comar
Gulf:	Bob Stickney, Tom McIlwain and Craig Tucker
Southwest:	Jim Sullivan, Dick Neal and Cheng Sheng Lee
Northwest:	Bob Malouf, Bob Iwamoto and Ken Chew
Mid-West:	Phil Pope and Ted Batterson

Appendix C. Workshop Participant List

(Note: We found a number of errors in this list. Please send corrections to ben.mieremet@noaa.gov (302/482-2046) and we'll update.

Last name	First name	Office	Street Address1	Street Address2	City/State	Zip	Phone	Fax
Allen	Rus	US Marine Shrimp Farming Assoc.	3450 Meridan Road		Okemos, MI	48864	571-347-5537	360-
Alvord	Dennis	EDA/DOC	DOC/EDA	14th Street and Constitution Avenue, NW, Rm. 7326	Washington, DC	20230	202- 482-4320	202-
Anderson	Emory	NOAA / NMFS	1315 East West Highway	SSMC3	Silver Spring, MD	20910	301-713-2435 x.144	301-
Aoelua	Solomona	Legislative Assistant	Congressman Faleomavaega's Office	US Congress, Rayburn 2422	Washington, DC	20001	202-225-8577	202-
Bauersfeld	Paul	NOAA/NOS/ Center for Coastal Environmental Health	219 Ft. Johnson Rd.		Charleston, SC	29412	843-762-8570	843-
Beattie	Janice	NOAA Library	1315 East West Highway	SSMC3	Silver Spring, MD	20910	301-713-2607 ext. 139	301-
Benetti	Daniel	Rosenstiel School of Marine & Atmospheric Science	4600 Rickenbacker Cswy.		Virginia Key, FL	33149	305-361-4889	305-
Bigford	Tom	Office of Habitat Conservation F/HC2	SSMC3 15317 1315 East West Highway		Silver Spring, MD	20910	301- 713-2325	301-
Blankenship	Lee	WA Dept. of Fish & Wildlife		600 Capitol Way N	Olympia, WA	98501	206-902-2748	
Borgia	Matthew	NOAA Office of Sustainable Development and Intergovernmental Affairs	14th & Constitution Ave, NW	RM. 5222	Washington, DC	20230	202-482-1846	202-
Boyd	Claude	Auburn University	Dept. of Fisheries and Allied Aquaculture		Auburn, AL	36849	334-844-4078	334-
Brick	Robert		1309 Foxfire		College Station, TX	77845	409-821-0260 ext. 13	409-

Broussard	Meryl	USDA	901 D Street	Aerospace Building, Rm 320-C	Washington, DC	20250	202-401-6438	202-
Brown	Paul	Dept. of Forestry and Natural Resources	Purdue University	1159 Forestry Building	West Lafayette, IN	47907 -1159	765-494-4968	765-
Buck	T. Robins	VA Department of Agriculture and Consumer Services	PO Box 1163		Richmond, VA	23218	804-371-6094	804
Bunn	Commande r Alan	NOAA/NOS Sea Grant	1716 Briarcrest	Suite 702	Bryan, TX	77802	409-845-3955	409-
Calabrese	Tony	NMFS Milford Lab	212 Rogers Ave.		Milford, CT	06460	203-579-7040	
Castle	Roy	Aquaculture Seafood Program, Maryland Dept. of Agriculture	50 Harry S. Truman Parkway		Annapolis, MD	21401	410-841-5724	410-
Cates	John	Safety Boats Hawaii, Inc.	780 Kaipii Street		Kailua, HI	96734	808-221-0696	808-
Chappell	Jessee	Southland Fisheries Corporation	600 Old Bluff Road		Hopkins, SC	29061	803-776-4923	803-
Chew	Ken						206-543-4270	
Clarke	Elizabeth	Office of Science and Technology	SSMC3 12555		Silver Spring, MD	20910	301-713-2367	301-
Collette	Bob	National Fisheries Institute					703-524-8883	703-
Comar	Paul	Microbiologist	Center for Coastal Environmental Health & Biomolecular Research	219 Fort Johnson Road	Charleston, SC	29412	843-762-8558	843-
Costa-Pierce	Barry	Fisheries Ecosystem International	222 South Helix	Suite #1	Solana Beach, CA	92075	228-875-9368	228-
Crawford	Maurice	NOAA/Natural Center for Coastal Ocean Science	1305 East-West Hwy.		Silver Spring, MD	20910	301-713-2989	301-
Cresswell	LeRoy	Harbor Branch Oceanographic Institute	5600 US 1 North		Fort Pierce, FL	34946	561-465-2400 x.405	561-
Daniels	Harry	NCSU	207 Research Station Road		Plymouth, NC	27962	252-793-4428	252-
DeVoe	Rick	SC Sea Grant	287 Meeting Street		Charleston, SC	29401	843-727-2078	843-
Dewey	Bill	Pacific Coast Oyster Growers Assoc.	120 State Ave. NE	#142	Olympia, WA	98501 -8212	425-454-2828	425-

Drennan	Douglas	Aquaculture Technology Systems, LLC	P.O. Box 15827		New Orleans, LA	70175	504-837-5575	504-
Duffy	Chris	Great Bay Aquafarms Inc.	153 Gosling Road		Portsmouth, NH	03801	603-430-8057	603-
Dunn	Leo	PA Dept of Agriculture & US ANS Task Force	2301 North Cameron Street		Harrisburg, PA	17110 -9804	717-783-8462	717-
Ellis	Tom	Aquaculture & Natural Resources	NC Dept. of Agriculture	PO Box 27647	Raleigh, NC	27611	919-733-7125	919-
Erbacher	Jerry	NOAA / NWS	Office of Industry and Trade	1315 East-West Hwy. SSMC3 3675	Silver Spring, MD	20910	301-713-2379 ext. 144	301-
Evans	Dave	OAR	1315 East-West Hwy.	SSMC3	Silver Springs, MD	20910 -0163	301-713-2458	301-
Farewell	Tom	Director, The Oceanic Institute	41-202 Kalanianoaole Hwy		Waimanalo, HI	96795	808-259-7951	808-
Faudskar	John	Oregon Extension Sea Grant	Tillamook County Extension Office	2204 Fourth Street	Tillamook, OR	97141 -2491	503-842-3433	503-
Flick	George	Food, Science, Technology Dept.	Virginia Tech - 0418		Blacksburg, VA	24061	540-231-6965	540-
Garrett	E. Spencer	USDC/NOAA/NFS	National Seafood Inspection Lab	705 Convent Ave.	Pascagoula, MS	39567	228-769-8964	228-
Goudey	Clifford	Massachusetts Institute of Technology	Building E38-370	292 Main Street	Cambridge, MA	02139	617-253-7079	617-
Halvorson	Harlyn	Director, Policy Center for Marine Bioscience	University of Massachusetts, Boston		Boston, MA	02125 -3393	617-287-7458	617-
Harrison	Kim	Northeastern Regional Aquaculture Center	University of Massachusetts Dartmouth	285 Old Westport Road, Research 201	North Dartmouth, MA	02747 -2300	508-999-8157	508-
Heggelund	Per	Aqua Seed Corporation	4530 Union Bay Place, NE, #110		Seattle, WA	98105 -4000	206-527-6696	206-
Helsley	Charles	Director, University of Hawaii	Sea Grant College Program	1000 Pope Road, MSB Rm 220	Honolulu, HI	96822	808-956-7031	808-
Hopkins	Kevin	University of Hawaii at Hilo	200 West Kawili Street		Hilo, HI	96720	808-974-7393	808-
Hopkins	Steve	Waddell Mariculture Center					803-837-3795	
Iwamoto	Bob	NWFSC	2725 Montlake Blvd. East		Seattle, WA	98112	206-860-3380	206-
Jaeneke	Fritz	Harlingen, Shrimp	2814		Harlingen,	78550	210-233-5723	210-

		Farm, Ltd.			TX			
Jahncke	Michael	Virginia Tech	VSAREC, 102 S. King Street		Hampton, VA	23669	757-727-4861	757-
Jenkins	Wallace	SC DNR	217 Ft. Johnson		Charleston, SC	29422 -5411	843-762-5411	843-
Ji	Ying	Minnesota Department of Agriculture	90 West Plato Blvd.		St. Paul, MN	55107	651-296-5081	651-
Joner	Steve	Makah Fisheries Management – Makah Tribe	PO Box 115		Neah Bay, WA	98357	360-645-3157	360-
Jones	Jim							512-
Kaiser	David	Federal Consistency Coordinator	NOAA, OCRM	1305 East West Hwy. 11th Floor	Silver Spring, MD	20910	301-713-2325 ext. 145	301-
Kehoe	Kerry	Coastal States Organization	444 North Capitol Street NW	Suite 322	Washington, DC	20001	202-508-3860	202-
Kraeuter	John	Haskin Shellfish Lab	Rutgers University	6959 Miller Avenue	Port Norris, NJ	08349	609-785-0074	609-
Lamon	Kenneth P.	NOAA/OAR International Activities	1315 East-West Hwy.	SSMC3, 11th Floor	Silver Spring, MD	20910 -3282	301-713-2469 ext. 168	301-
Langdon	Chris	Dept. of Fisheries & Wildlife	Hatfield Marine Science Center	Oregon State University	Newport, OR	97365	541-867-0231	541-
Langen	Richard							
Lazur	Andy	Mitchell Aquaculture Farm	Universiy of Florida/Fisheries Aquatic Science Dept.	Route 2, Box 754	Blountstown , FL	32424	850-674-3184	850-
Leber	Ken	Mote Marine Laboratory	1600 Ken Thompson Parkway		Sarasota, FL	34236	941-388-4441	941-
Lee	Phillip	Marine Biomedical Institute	University of Texas, Medical Branch		Galveston, TX	77555 -1163	409-772-3660	409-
Leffler	Meryl	Sea Grant					301-405-6371	301-
Leonard	Dot	NMFS	1305 East-West Hwy.	Station 15205	Silver Spring, MD	20910	301-713-2325 ext. 145	301-
Lindell	Scott	AquaFuture, Inc.	Box 783	15 Industrial Road	Turners Falls, MA	01376	413-863-8905	413-
Losordo	Thomas	NCSU	Campus Box 7646		Raleigh, NC	27695 -7646	919-515-7587	919-
Lotz	Jeffery	Gulf Coast Research Laboratory	P.O. Box 7000		Ocean Springs, MS	39566	228-872-4247	228-
Loverich	Gary	Ocean Spar Technologies,	N.E. Day Road West		Bainbridge Island, WA	98110	206-780-1145	206-

		L.L.C.						
Ludwig	Michael	NOAA/NMFS?NER, Habitat Conservation Division	212 Rogers Ave.		Milford, CT	06460-6499	203-579-7004	203-
Mahnken	Conrad	NWFSC	7305 Beach Drive East		Port Orchard, WA	98365	206-553-0633	206-
Mayeaux	Maxwell	USDA/CSREES/PAS	901 D Street, SW		Washington, DC	20250	202-401-3352	201-
McDowell	Judith	Woods Hole Oceanographic Institution	MS No. 2		Woods Hole, MA	02543	508-289-2557	508-
McGonigle	Joseph	Marine Aquaculture Association	141 North Main Street	Suite 202	Brewer, ME	04412	207-989-5310	207-
McIlwain	Thomas	NMFS	3209 Frederic Street		Pascagoula, MS	39567-4112	228-762-4591 ext. 285	228-
McVey	James	Aquaculture Advisor	Office of Sea Grant, OAR, NOAA				301-713-2451	301-
Mears	Harold	National Marine Fisheries Service, NE Region	One Blackburn Drive		Gloucester, MA	01930	978-281-9243	978-
Mieremet	Ben	OSDIA/NOAA	14th & Constitutional Ave., Rm 6221		Washington, DC	20230	202-482-2046	202-
Miller	Otis	National Aquaculture Coordinator	National Animal Health Programs	USDA 4700 River Road, Unit 43	Riverdale, MD	20737-1231	301-734-6188	301-
Miller	Boyce Thorne	Sea Web	21210 Peach Tree Road		Dickerson, MD	20842	301-972-7028	202-
Miller	Brian	IL-IN Sea Grant College Program	Perdue University		West Layfayette, IN		765-494-3586	765-
Monteferrante	Frank	EDA/DOC	HC Hoover Bldg. Room 7816		Washington, DC	20230	202-482-4208	202-
Moore	Katie	Office of Protected Resources	NMFS, 1305 East West Highway		Silver Spring, MD	20910	301-713-2322 x.157	301-
Morikawa	Tohru	Overseas Fishery Consultant Asso.	12 Mori-Bldg. 1-17-3	Toranomon, Minatoku	Tokyo, Japan	105-0001	(+81) 3-2596-9001	(+81 900
Murray	Jim	Sea Grant	1315 East-West Hwy.	SSMC3	Silver Spring. MD	20910	301-713-2451 ext. 152	301-
Nash	Colin	NWFSC	7305 Beach Drive East		Port Orchard, WA	98366	206-842-8365	206-
Nosho	Terry	Sea Grant Advisory	2716 Brooklyn Ave.,	University of	Seattle, WA	98105	206-543-2821	206-

		Service	NE	Washington				
O'Dierno	Linda							609-
Oesterling	Michael	Marine Advisory Services	VA Institute of Marine Science		Gloucester Point, VA	23062	804-642-7165	804-
Olin	Paul	Sea Grant Extension	California Sea Grant	2604 Ventura Avenue	Santa Rosa, CA	95403	707-527-2621	707-
Pierce	Maia	USDA/CSREES/PAPP	1400 Independence Ave SW		Washington, DC	20250 -2220	202-401-3356	202-
Plemmons	Bryan	VA Aquaculture Advisory Board	Route 1	Box 151	Goshen, VA	24439	540-997-5461	Sam first
Pope	Phillip	Director IL – IN Sea Grant College Program	Dept. of Forestry & Natural Resources	1200 Forest Products Building	West Layfette, IN	47907	765-494-3573	765-
Pruder	Gary	The Oceanic Institute	41-202 Kalanianoaole Hwy		Waimanalo, HI		808-259-3105	808-
Ralonde	Ray L.	Sea Grant Marine Advisory Program	University of Alaska/Fairbanks	2221 E. Northern Lights # 110	Anchorage, AK	99508	907-274-9691	907-
Ravella	Peter	Director, Coastal Division, Texas General Land Office	Stephen A. Austin Building	1700 N. Congress Avenue	Austin, TX	78701 -1495	512-305-8593	512-
Rawson	Mac	Georgia Sea Grant Program	University of Georgia-Ecology Building		Athens, GA	30602	706-542-5954	706-
Redden	Gerald	Maryland Aquaculture Association	AquaMar Industries, Inc.	1945 Pocomoke Beltway	Pocomoke City, MD	21851 -9537	410-957-0206	410-
Rhodes, Jr.	Edwin W.	Aquaculture Coordinator	Office of Sustainable Fisheries, NMFS, NOAA	1315 East-West Hwy.	Silver Spring, MD	20910	301-713-2334 ext. 102	301-
Riaf	Ken	Gloucester Aquaculture Project	33 Commercial Street		Gloucester, MA	01930	978-281-8900	978-
Rickards	Bill	Virginia Sea Grant College Program	170 Rugby Road		Charlottesville, VA	22903	804-924-5965	804-
Romaire	Robert	Aquaculture Research Station	2410 Ben Hur Road		Baton Rogue, LA	70820	225-765-2648	225-
Rosenthal	Harald	Institute for Oceanography	University of Kiel		Kiel, Germany		(+49) 431-597-3916	(+49 597-
Rust	Mike	NWFSC	2725 Montlake Blvd. East		Seattle, WA	98112	206-860-3382	206-
Salters	Betsy	EPA						
Sandifer	Paul						803-734-4007	
Schnick	Rosalie		3033 Edgewater Lane		LaCrosse, WI	54603 -1088	608-781-2205	608-

Schwarz	Michael	VASREC – Virginia Tech	102 S. King Street	PO Box 369	Hampton, VA	23669	757-727-4861	757-
Selock	Dan	Office of Economic Development and Regional Development	Southern Illinois University at Carbondale	150 E. Pleasant Hill Road	Cardondale, IL	62901	618-536-4451	618-
Sholts	Erwin "Bud"							608-
Soares	Scott J.	Aquaculture Coordinator, MA Dept. of Food and Agriculture	Leverett Saltonstall Building	100 Cambridge Street, Rm. 2103	Government Center, Boston, MA	02202	617-727-9800 x.238	617-
Stickney	Robert	Director, Texas Sea Grant	1716 Briarcrest Suite	Suite 702	Bryan, Texas	77802	409-845-3854	409-
Stokes	Al	Waddell Mariculture Center	PO Box 809		Bluffton, SC	29910	843-837-3795	843-
Sweker	Dan	Executive Director	Washington Fish Growers Assoc.	10420 173rd Avenue SW	Rochester, WA	98579	360-273-5890	360-
Tacon	Albert	The Oceanic Institute	41-202 Kalanianoaole Hwy		Waimanalo, HI	86795	808-259-5971	808-
Turner	Elizabeth	NOAA Coastal Programs	1305 East West Hwy	Room 11200	Silver Spring, MD	20910	301-713-3338 ext. 135	301-
Watanabe	Wade	Center for Marine Science Research	UNC-Wilmington	7205 Wrightsville Ave.	Wilmington, NC	28403	910-256-5133	910-
Weidenbach	Ron	Hawaii Aquaculture Association	68-760 Farrington Hwy.	Bldg. T-224	Waialua, HI	96991	808-637-0999	808
Wieting	Donna	Office of Protected Resources F/PR2	1315 East-West Hwy.	SSMC3 13708	Silver Spring, MD	20910	301-713-2322 ext. 108	301-
Yarish	Charlie	University of Connecticut	Dept. of Ecology & Evolutionary Biology	1 University Place	Stamford, CT	06901 -2315	203-251-8432	203-
Young	Kim	FDA/ Office of Seafood	200 C Street SW		Washington DC	20240	202-418-3176	

Appendix D. Workshop Evaluation Results

AQUACULTURE WORKSHOP EVALUATION RESULTS
(28 RESPONSES)

Please mark an "X" in the box that best describes your response to the following statements.	Not at All (1)	Disagree (2)	Somewhat (3)	Agree (4)	Absolutely (5)
The workshop content was up to date and provided practical information.		3.7%	22.2%	37.0%	37.0%
The workshop content was at the appropriate level of expertise.			25.9%	33.3%	40.7%
The content of the presentations was relevant to my job.			33.3%	44.4%	22.2%
Time allotted for break out sessions was appropriate.		3.5%	7.1%	71.4%	17.8%
The workshop content will be directly applicable to my job.		3.5%	32.1%	35.7%	28.5%
The length of the workshop was appropriate to cover the material presented.	3.7%		14.8%	70.3%	11.1%
Overall, I am satisfied with the workshop.		3.5%	7.1%	64.2%	25.0%

The comments listed were most common on the evaluations and are unedited.

What was the most valuable part of the workshop for you?

- Prioritizing research goals.
- Interacting with the powers-that-be.
- Networking.
- Diversity of geographic regions represented international speakers – great info.
- Listening and looking forward to the information generated from this workshop.
- The opportunity to meet with other "stakeholders" in Aquaculture as well as agency (federal) representatives. Guest lecturers were an excellent choice.

What was the least valuable part of the workshop for you?

- More guidance up front as to the goals of the break out groups.
- Needed more caucus direction if the workshop organizers had specific goals in mind.
- The inability to sit in on other break outs because they were in scattered sites and unknown rooms.
- Much time wasted the first morning with greetings.

What, if anything, would you like to have added, deleted, or changed in the workshop?

- More regional discussion groups.
- Marketing and international sessions would have added to the mix.
- More notice, more industry involvement. Allow migration between break out groups.
- Invite environmental group representatives – because their concerns carry a great deal of weight with NOAA actions and they are an organized group.
- Spend more time reviewing the draft DOC Legislation.

Any additional comments would be appreciated.

- Well organized. Thank you.
- Would like a summary of the funding and technical support resources that are available to accomplish policy.
- More industry participation!